

E. Use the Distributive Property to write each expression in expanded form.

1. $(x + 5)(x + 5)$
2. $(x + 3)(x - 4)$
3. $2x(5 - x)$
4. $(x - 3)(x - 4)$
5. $(x + 2)(x - 2)$

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2.4 Factoring Quadratic Expressions

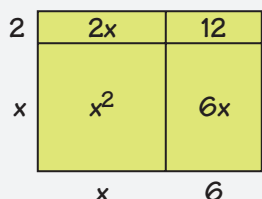
You know two ways to change a factored expression, such as $(x + 2)(x + 6)$, to expanded form.

Rectangle Model

Subdivide.



Label areas.



Add the areas of the sections:

$$\begin{aligned}(x + 2)(x + 6) &= x^2 + 2x + 6x + 12 \\ &= x^2 + 8x + 12\end{aligned}$$

Distributive Property

$$(x + 2)(x + 6) = (x + 2)x + (x + 2)6$$

$$= x^2 + 2x + 6x + 12$$

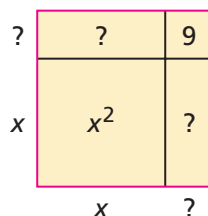
$$= x^2 + 8x + 12$$

How can you write an expanded expression, such as $x^2 + 8x + 12$, in factored form?

In the next problem, we will use the distributive property to write expressions in factored form.

Problem 2.4 Factoring Quadratic Expressions

- A. 1.** Copy the diagram. Replace each question mark with the correct length or area.
- 2.** Write two expressions for the area of the rectangle outlined in red.
- B.** Consider this expression.



$$x^2 + bx + 8$$

- 1.** Choose a value for b that gives an expression you can factor. Then, write the expression in factored form.
- 2.** Compare your work with your classmates. Did everyone write the same expressions? Explain.
- C.** In parts (1)–(4), find values of r and s that make the equations true.
- $x^2 + 10x + 24 = (x + 6)(x + r)$
 - $x^2 + 11x + 24 = (x + s)(x + r)$
 - $x^2 + 25x + 24 = (x + r)(x + s)$
 - Describe the strategies you used to factor the expressions in parts (1)–(3).
- D.** Alyse says she can use the Distributive Property to factor the expression $x^2 + 10x + 16$. She writes:

$$x^2 + 10x + 16 = x^2 + 2x + 8x + 16 \quad (1)$$

$$= x(x + 2) + 8(x + 2) \quad (2)$$

$$= (x + 2)(x + 8) \quad (3)$$

Is Alyse correct? Explain what she did at each step.

- E.** Use the Distributive Property to factor each expression.
- $x^2 + 5x + 2x + 10$
 - $x^2 + 11x + 10$
 - $x^2 + 3x - 10$
 - $x^2 + 16x + 15$
 - $x^2 - 8x + 15$
 - $x^2 - 12x + 36$

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